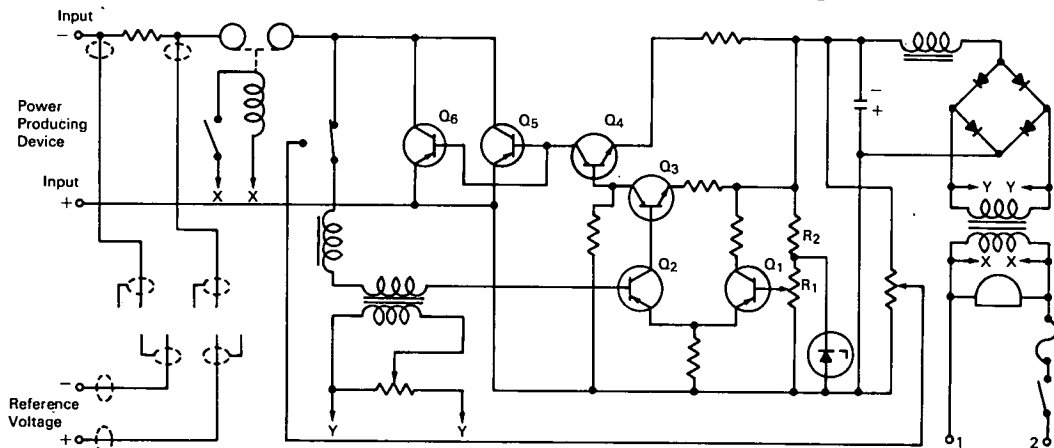


NASA TECH BRIEF



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Electronic Load for Testing Power Generating Devices



A test instrument has been devised for life test of various electric power generating devices such as thermionic energy conversion devices, thermoelectric generators, etc. The devices are connected to the input of the load and their outputs compared with a reference voltage. The load automatically adjusts until the voltage output of the power generating device matches the reference voltage. The load circuitry provides constant current or constant voltage loads as desired and may be operated to sweep between open circuit and saturation conditions at a 60 cps rate.

One embodiment of the load is illustrated and operates as described below.

The power producing device to be tested is connected across the power switching transistors Q_5 and Q_6 with the indicated polarities. The type and number of transistors (in parallel with Q_5 and Q_6) is determined by the power producing device to be tested. Q_4 drives the power switching transistors Q_5 and Q_6 . Q_1 and Q_2 form a differential amplifier. A reference voltage that may be adjusted by R_1 will maintain a constant voltage across R_2 .

In the constant voltage operation, the voltage of the power producing device is sensed across the switching transistor and compared at Q_2 to the reference voltage. If the voltage of the power producing device is higher than the selected reference voltage, Q_2 will drive Q_3 into conduction. This, in turn, will drive the drive transistor Q_4 until the voltage across the current switching transistors Q_5 and Q_6 approaches the selected reference voltage. Q_3 and Q_4 will provide sufficient drive to maintain this voltage at a constant level. Due to the high gains of the differential amplifier (Q_1 and Q_2) this arrangement will maintain a constant voltage across the input terminals over a wide range of currents.

In the constant current mode, the voltage sensing loop is disconnected from the input terminal and is switched across an adjustable voltage divider. A constant driving current can now be selected which will be maintained independent of the input voltage. To obtain a dynamic output performance of the device under test, the current switching transistor is alternately switched from open to saturation condition.

(continued overleaf)

This is done at a 60 cps rate and the amplitude is adjusted by means of a potentiometer. A choke, placed in the base circuit of Q₂, prevents the load from oscillating.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
NASA Pasadena Office
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Reference: B68-10203

Patent status:

No patent action is contemplated by NASA.

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